MEMORANDUM

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To: Ryan Miya, DTSC
Craig Hunt, RWQCB

From: Bridgette DeShields
Kris Fabian, P.E.
Judy Nedoff

Re: Backfill/Cap Design for Foundation Removal Areas

Date: August 22, 2006

cc: Ms. Denise Tsuji, DTSC
Ms. Linda Ruffing, City of Fort Bragg
Nancy Atkinson, City of Fort Bragg
Mr. Glenn Young, Fugro West, Inc.
Mr. Mark Stelljes, SLR International Corp.
Ms. Carol Stephens, Georgia-Pacific Corporation
Ms. Julie Raming, Georgia-Pacific Corporation
Mr. Doug Heitmeyer, Georgia-Pacific Corporation
Mr. Michael Acton, AME

This memorandum describes the proposed methods and design specifications for backfilling/capping the foundation removal areas at the former Georgia Pacific Corporation (G-P) California Wood Products Manufacturing Facility, 90 West Redwood Avenue, Fort Bragg, California (site).

BACKGROUND

In the March 28, 2006 letter from Acton Mickelson Environmental, Inc. (*Clarification and Modification to Work Plan for Foundation Removal, Additional Investigation, and Interim Remedial Measures Dated March 21, 2005, Addenda #1 and #2 to the Work Plan for Foundation Removal, Additional Investigation, and Interim Remedial Measures Dated May 6 and August 19, 2005, Respectively, and Response to RWQCB Comments Dated July 18, 2005*), the following discussion regarding backfilling/capping of the foundation areas was presented:

> "Interim capping will be implemented in foundation-removal/impacted soil excavation areas anticipated to require remedial action during the final remedial phase. The interim cap will be designed to mitigate potential transport of the detected constituents of potential concern (COPCs) during this limited time period. Specifications regarding the type, design, and implementation of the interim cap cannot be defined at this time due to uncertainty regarding the physical and chemical conditions in these potential areas. Low permeability caps that may be considered in potentially impacted areas include:
>
> - Fine-grained materials (e.g., clay or silt)
> - Asphalt
> - Concrete
> - Geomembrane material.
>
> The final selection, design, and implementation of all interim caps at the site will be made with the concurrence of the RWQCB."

PURPOSE OF BACKFILLING/CAPPING

Excavation areas, opened up as part of foundation removal, need to be backfilled/capped to:

- Bring the areas back to grade according to requirements of the City of Fort Bragg Grading Permit;
- Facilitate site surface drainage; and
- Reduce health and safety hazard on the site.

and, where COPCs are left in place that may require future remedial action:

- Reduce the possibility of migration of contaminants that may be present in soil and/or groundwater under the former foundations until the site investigation is completed, there is a comprehensive understanding of the nature and extent of subsurface contamination, and a remedial action concept is developed.

Based on this discussion, there are three types of areas where caps will be required for foundation removal areas:

1. Backfilling of areas where interim remedial measures (IRMs) are implemented (see separate IRM memos prepared by AME). If confirmation samples from IRMs are collected and show that the IRMs resulted in acceptable reduction of concentrations of COPCs, backfilling with clean, suitable soils can be implemented. If post-removal sampling cannot be conducted or residual levels of COPCs are above acceptable levels, an "interim cap" as described above from AME's March 28, 2006 memorandum may be required.
2. Areas where sampling adjacent to and beneath the former foundations showed acceptable levels of COPCs could also be backfilled with clean, suitable soils.
3. Areas where remedial measures may be required in the future would require an "interim cap" as described above from AME's March 28, 2006 memorandum.

Caps in all three areas require the use of suitable, clean backfill. Backfill would need to have concentrations of chemicals below conservative screening levels (see AME's IRM memos). The backfill material for the dry areas would also need to support revegetation with native plants (as required by the California Coastal Commission Coastal Development Permit [CDP]) or a layer of topsoil would need to be used that would support native plants.

CAPPING DESIGN

Given the current schedule for completion of the current phase of the foundation removal project (mandated to be complete by October 15, 2006 by the CDP) and the transition of the project to the Department of Toxic Substances Control Board (DTSC), if decisions about IRMs cannot be made and/or IRMs cannot be completed before the end of the construction season, interim caps may be placed on some or all areas. If IRMs can be approved and implemented and/or the DTSC approves "final capping" of some areas (i.e., a soil/clean fill only cap), a limited number of interim caps may be necessary. The following provides the proposed "interim cap" designs for areas that are dry and those where groundwater is daylighting. Both designs incorporate a geomembrane.

Capping in dry areas, i.e., areas where groundwater is not likely to extend to the bottom of the excavations, the interim cap will consist of the following:

- geosynthetic clay liner (Bentomat ST[1] or equivalent) laid on the bottom of the excavation overlain by;
- clean inert material filled and compacted in the excavation area to grade; and
- filled slightly above existing surface and graded to promote runoff from the interim cap
- revegetate with a native seed mix.

The geosynthetic clay liner will provide a relatively thin (4-6 millimeters [mm]) low permeability barrier between the foundation soils and overlying clean fill; it will also provide a marker layer. Note that all foundation excavations will be surveyed by a licensed surveyor prior to backfilling/capping.

Capping in wet areas, i.e., areas where groundwater is likely to extend to the bottom of the excavations, the interim cap will consist of the following:

- geotextile (nonwoven needle punched geotextile: GSE NW8[2] or equivalent) laid on the bottom of the excavation overlain by;
- crushed rock/crushed concrete rubble (1 to 4 inches) filled and lightly compacted in the excavation area to grade; and
- filled slightly above existing surface and graded to promote runoff from the interim cap.

The geotextile will be semi-permeable, allowing groundwater to percolate through thus reducing the potential of the build up of excess pore pressure; it will, however, provide a marker layer and provide some resistance to any contaminant migration.

Typical cross-sections of both the dry and wet interim cap designs are shown on Figure 1.

BBL is currently securing a source of clean fill/soil. One possibility is clean, stockpiled dredged material from Noyo Harbor (full analytical data are available for this material and will be provided to G-P and BBL shortly). Other sources of clean fill and topsoil (which could be necessary, for example, if the dredged material has a high salt content) are being explored. Only clean concrete (with concentrations of chemicals below conservative screening levels) will be crushed and reused as backfill.

According to the CDP and provision of the City of Fort Bragg (grading) permit:

> "Following completion of the excavation, all areas that are excavated or otherwise left with exposed soils shall be revegetated with native plant species.,. The permittee shall provide irrigation, maintenance and replacement of revegetated areas, as needed, to ensure the long-term viability of the plants."

G-P is utilizing a qualified local botanist to design the revegetation program. Additional details on the revegetation (i.e., composition of seed mix, etc.) will be forwarded once they are available.

Enclosure: Figure 1 – Interim Capping Options, Typical Cross Sections

BRD/brd

[1] www.cetco.com/groups/Lining/products/GCL.asp
[2] www.gseworld.com/Products/nw-geotextiles/PDFDOC/AP029Geotext.pdf#search=%22geotextile%20NW8%22

Figure

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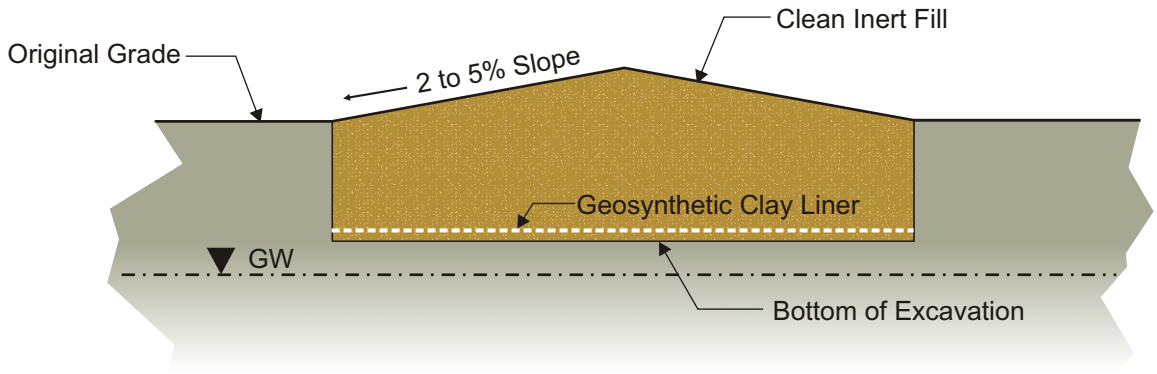
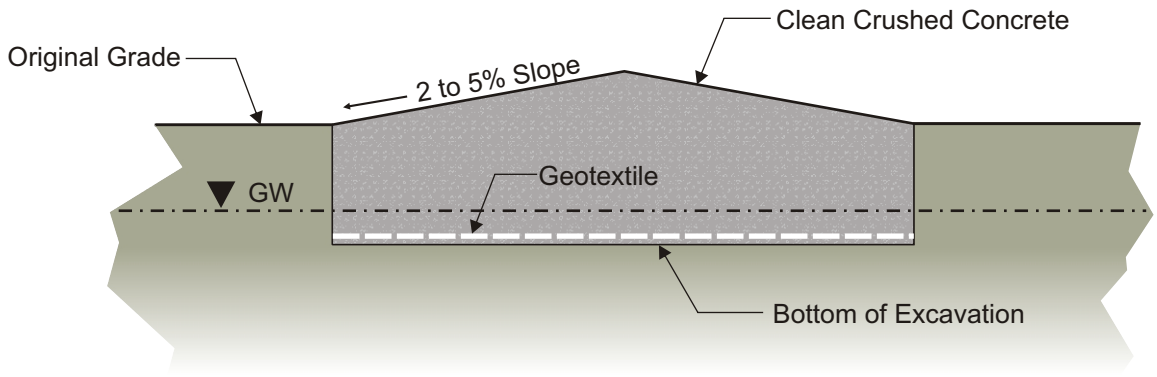
Dry Interim Cap



Wet Interim Cap



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FORT BRAGG, CALIFORNIA

FOUNDATION EXCAVATIONS

INTERIM CAPPING OPTIONS
TYPICAL CROSS SECTIONS

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FIGURE
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